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Part II of Two Parts  
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PRIME ITEM PRODUCT FABRICATION SPECIFICATION

FOR

INITIATOR, BOMB FUZE

FZU-48/B

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PRIME ITEM PRODUCT FABRICATION SPECIFICATION

INITIATOR, BOMB FUZE, FZU-48/B

1. SCOPE

1.1 Scope. This specification establishes the requirements for manufacture and acceptance of the FZU-48/B Bomb Fuze Initiator, referred to herein as the "initiator." Appendix I establishes the requirements for manufacture and acceptance of the training version of the initiator.

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

SPECIFICATIONS

MILITARY

MIL-A-2550C 17 Nov 77	Ammunition, General Specification for
MIL-L-81558A change notice 1, 14 May 87	Lug, Suspension, Airborne Equipment

STANDARDS

FEDERAL

FED-STD-102B 29 Jan 63	Preservation, Packaging, and Packing Levels
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MILITARY

DOD-STD-2101(OS) 10 May 79	Classification of Characteristics
MIL-STD-105D 20 Mar 64	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129H change notice 1, 5 Nov 86	Marking for Shipment and Storage
MIL-STD-331A change notice 11, 1 Oct 87	Fuze and Fuze Components, Environmental and Performance Tests for

MIL-STD-454G change notice 3, 10 Sep 81	Standard General Requirements for Electronic Equipment
MIL-STD-810C change notice 1, 7 Apr 81	Environmental Test Methods
MIL-STD-1168A 28 Feb 75	Ammunition Lot Numbering
MIL-STD-1235B 10 Dec 81	Single- and Multi- Level Continuous Sampling Procedures and Table for Inspection by Attributes

DRAWINGS

98747-9042212	Packing and Marking, (Pre-installed Cable) Fuze System, FMU-139A/B
18894-8385211	Interface Control Drawing, FZU-48/B
18894-8385220	Initiator, Bomb Fuze, FZU-48/B
98747-IL9042211	FMU-139A/B Fuze and Accessories (USAF), Index List
98747-9042203	Cable, Power (Filtered)
18894-8385309	Deflector, Air Turbine, MAU-197/B
18894-68D7219	MAU-129A Lug, Suspension, Bomb
30003-1379AS198	Ring, Closure
30003-1379AS600	Fuze, FMU-139A/B
98747-9042210	Fuze Set, FMU-139A/B With Pre-installed Cable
98747-9042204	Interface Control Drawing, Fuze, FMU-139A/B USAF
98747-9042211	FMU-139A/B Accessories

(Copies of specifications and standards required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

### 3. REQUIREMENTS

3.1 Item definition. The FZU-48/B is an air-driven turbine generator and safety switch assembly for use in the charging well of the M-117 and Mark 80 series general purpose bombs. It provides dual FMU-139A/B fuze operating and sensor initiation power, launch signal interface, and proximity sensor-to-fuze interface between front and rear internal conduit of the bomb as defined on Drawing 8385211. The FMU-139A/B Fuze Set Interface Control Drawing (9042204) references interconnection between Fuze-Power Cable and FZU-48/B.

3.1.1 Major component list. Not applicable.

3.1.2 Government furnished property list. Not applicable.

### 3.2 Characteristics.

#### 3.2.1 Performance.

##### 3.2.1.1 Functional requirements.

##### 3.2.1.1.1 Lanyard.

3.2.1.1.1.1 Lanyard pull force. The initiator shall be activated by a lanyard static pull force not less than 30 pounds and not greater than 100 pounds when translated to the vertical at any angle within 30 degrees from the vertical.

3.2.1.1.1.2 Lanyard separation force. The initiator shall physically separate from the aircraft after cover opening. A static shear force of not less than 128 pounds and not greater than 185 pounds shall cause separation of the lanyard at the designed shear point.

3.2.1.1.2 Electrical output. Electrical output shall be measured during functional tests using the test set-up of figure 1 and a simulated dual FMU-139 fuze load illustrated schematically in figures 2 and 3. During functional tests, the free air stream velocities stated in this specification shall be adjusted, in accordance with table I, to compensate for losses due to the initiator position behind the lug of the bomb during actual weapon employment.

3.2.1.1.2.1 No start. With the cover up and the alternator stopped, exposure to a free air stream of 100 KCAS maximum shall not start the alternator, and the initiator shall not produce an electrical output.

3.2.1.1.2.2 Start. With the cover up and exposed to a free air stream of 250 KCAS minimum, the initiator shall start and produce the 75 Vdc minimum when measured at V.OUT in figure 3.

3.2.1.1.2.3 Minimum run. With the cover up and the output of 3.2.1.1.2.2 established, the initiator output shall remain above 32 Vdc when measured at V.OUT in figure 3 when the free air stream is reduced to 140 KCAS minimum.

3.2.1.1.2.4 High speed operation. When installed in M-117 or MK-80 series bombs with required lugs [D-Lug (MIL-L-81558), or T-Lug (Drawing 68D7219) with Air Turbine Deflector (Drawing 8385309)], the activated initiator with established electrical output shall retain a continuous output of 75 Vdc minimum when measured at V.OUT in figure 3 for at least 5 minutes when subjected to a free air stream of 375 KCAS minimum, and for at least 1 minute when subjected to a free air stream of 700 KCAS minimum.

3.2.1.1.2.5 Release signal. Upon mechanical activation, a turbine release signal shall be generated as described in table III. When measured with respect to ground (V.IN of figure 3) the turbine release signal is a negative voltage. At a free air stream of 250 KCAS, the magnitude of the turbine release signal shall be 2.1 volts peak minimum for 7 seconds after activation and shall decay to 0.5 volts peak maximum at 90 seconds after activation.

3.2.1.1.2.6 Electrical interface. The initiator shall provide pin-to-pin continuity between interface connectors and shall establish a case ground.

3.2.1.1.3 Environmental requirements. The initiator shall meet the requirements of 3.2.1.1.1 and 3.2.1.1.2 after being subjected to the environments of MIL-STD-331 and MIL-STD-810 tests.

3.2.1.1.3.1 Thermal shock. -65 degrees F to +160 degrees F in accordance with MIL-STD-331, Test 113.1.

3.2.1.1.3.2 Waterproofness. MIL-STD-331, Test 108.

3.2.1.1.3.3 High temperature. MIL-STD-810, Test 501.

3.2.1.1.3.4 Low temperature. Ambient to -65 degrees F in accordance with MIL-STD-810, Method 502.

3.2.1.1.3.5 Random vibration. MIL-STD-810, Method 514.2.

3.2.1.1.3.6 Temperature-humidity. MIL-STD-331, Test 105.1.

3.2.1.1.3.7 Extreme temperature storage. MIL-STD-331, Test 112.1.

3.2.1.1.3.8 Transportation vibration - temperature. MIL-STD-331, Test 119.

3.2.1.1.3.9 1.5 meter drop. MIL-STD-331, Test 111.1.

3.2.1.1.3.10 Salt fog test. MIL-STD-331, Test 107.1.

3.2.1.1.4 Reliability. The preproduction sample of 3.4 when flight tested in accordance with 4.2.2.1 shall be capable of meeting the performance requirements of SP8385220, Part I, paragraph 3.2.1 with an operational reliability of 0.98.

### 3.3 Design and construction.

3.3.1 Production drawings. The fuze initiator shall be fabricated and assembled with the drawings, data lists, and other documents listed on index list (IL) 9042211.

3.3.2 Standards of manufacture. Manufacturing processes used for production of the item shall assure fabrication of a quality product meeting the requirements specified herein. All materials and purchased parts shall conform to the drawings, data lists, and other documents specified herein. Manufacturing processes used for production shall be verified using MIL-STD-1235 or MIL-STD-105.

3.3.3 Workmanship. The standards of workmanship demonstrated throughout the fabrication and assembly of the initiator shall be in compliance with the applicable portions of MIL-STD-454 (requirement 9), MIL-A-2550, and the workmanship requirements specified in all other applicable specifications. Cleaning methods and agents used in fabrication shall not be injurious to any part, nor shall they contaminate or cause corrosion of any part. Solderability workmanship shall be in compliance with requirement 5 of MIL-STD-454.

3.4 Preproduction sample. Unless otherwise specified in the contract or purchase order, a preproduction sample shall be tested prior to regular production. The preproduction sample shall be produced using the same materials, methods, equipment, and processes as will be used in regular production.

## 4. QUALITY ASSURANCE PROVISIONS

4.1 General. The functional tests of 4.2.1 are nondestructive and shall be performed on a 100-percent basis. The tests are performed before any closure of the cover except for the test of 4.2.1.2 (electrical continuity). Functional testing of a completed and closed initiator, for the lot acceptance tests of 4.2.3, is a destructive test. A cross reference requirements listing is provided in table II.

4.1.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements. Inspection records of examination and tests shall be kept complete and available to the Government as specified in the contract or purchase order.

4.1.2 Lot formation. All initiators shall be identified into inspection/acceptance lots for the application of 4.1.3 and 4.2.3. The term "inspection lot" as used in this specification is defined as an essentially homogeneous collection of units of product from which a representative sample is drawn and inspected to determine conformance with applicable requirements. The sample selected shall represent only that quantity of units from which the sample was drawn and shall not be construed

to represent any prior or subsequent quantities presented for inspection. Homogeneity shall be considered to exist, provided the inspection lot has been produced by one manufacturer, in one unchanged process, in accordance with the same drawing and drawing revisions and same specification, and specification revision. Changes to any process, specification, or drawing not affecting safety, performance, interchangeability, or storage, as determined by the Government, shall not be deemed to alter the homogeneity of an inspection lot. Unless otherwise approved by the contracting officer, the lot size of end items deliverable under the contract shall not be less than 281 nor more than 1 month's production. Inspection lots of components or subassemblies, other than the items of delivery, shall be homogeneous and of a convenient size. Lot numbering, as required, shall be in accordance with MIL-STD-1168.

4.1.3 Submission of product. At the time the completed product is submitted to the Government for acceptance, the contractor, upon request, shall supply the following information accompanied by a certificate that attests that the information provided is correct and applicable to the product being submitted:

- a. A statement that the lot complies with all of the quality assurance provisions specified within this specification.
- b. Number of units of product specified.
- c. Results obtained, by defect code, for all inspections performed.
- d. Drawing, specification number, and date, together with an identification and date of changes.
- e. Certificates of conformance on all material purchased by the contractor when such material is controlled by Government or commercial specifications referenced in any of the contractual documents.
- f. Number of items in the lot.
- g. Date submitted.

4.2 Quality conformance inspection. Unless otherwise specified, the quality conformance inspection of 4.2.1 requires operation in an air stream defined by table I using the fixture in figure 1 to determine an operable condition. Operation shall be with the initiator connected to the simulated loads specified in figure 2. In addition, the destructive quality conformance inspection of 4.2.3 requires initiator activation.

4.2.1 Functional tests. All initiators shall pass all tests of this paragraph. Initiators that fail shall be discarded or reworked and again submitted to the tests of this paragraph. The test of 4.2.1.1 shall be conducted before cover closure.

4.2.1.1 Electrical output. All initiator outputs shall be measured in accordance with table III and figure 3.

4.2.1.1.1 No start. With the cover up, a free air stream of 100 KCAS minimum shall be applied to the initiator. No initiator output shall be produced.

4.2.1.1.2 Start. With the cover up, a free air stream of 250 KCAS maximum shall be applied to the initiator. The initiator outputs defined in table III shall be produced.

4.2.1.1.3 Minimum run. The contractor shall establish the conditions of 4.2.1.1.2 and reduce the free air stream to 140 KCAS maximum. The initiator outputs defined in table III shall be produced.

4.2.1.2 Electrical continuity. An electrical continuity test of the fuze initiator connectors shall conform to the requirements of table IV.

4.2.2 Preproduction sample. Prior to the initiation of regular production, the contractor shall submit a preproduction sample to the Government for evaluation. Regular production is under no circumstances authorized for initiation, unless otherwise directed by the contracting officer, until the preproduction sample is approved and/or accepted. The sample shall be manufactured in the same manner, using the same materials, equipment processes, and procedures as will be used in regular production. All parts and materials, including packaging and packing, shall be the same as will be used in regular production and shall be obtained from the same source of supply whenever possible. All tests of 4.2.1 and inspections of characteristics of 4.2.4 shall be successfully completed on all of the components, subassemblies, and assemblies used in the preproduction sample. The Government reserves the right to require additional preproduction samples whenever regular production is interrupted for 90 days or more. The contractor shall submit the preproduction sample of 262 initiators for testing by the Government in accordance with table V and figure 4, or 115 initiators for testing in accordance with tables V and VI, at Government request. The required operational tests of MIL-STD-331 and MIL-STD-810 shall consist of those defined for 4.2.3.1, Lot acceptance and functional tests. These tests are considered destructive; the items shall be disposed of and shall not be used further after test.

4.2.2.1 Reliability flight tests. Flight tests shall be performed with the initiator installed in the charging well of free-fall or guided M117 or MK80 series bombs. Test drops shall be made from operational aircraft within the flight characteristic performance limits of SP8385220, Part I, paragraph 3.2.1. Flight tests are fuze system tests using an FMU-139A/B fuze set (Drawing 9042210) consisting of FMU-139A/B fuze (1379AS600) and power cable (9042203), an FZU-48/B bomb fuze initiator (8385220), a closure ring (1379AS198), and an air turbine deflector (8385309), as required, to demonstrate the operational system reliability requirement of 0.95. Flight test acceptance and rejection criteria are specified in figure 4.

4.2.2.1.1 Simulated flight tests. When specified by contract or purchase order, a quantity of 57 initiators will be subjected to the simulated flight test environments of table VI in lieu of tests specified in 4.2.2.1. The simulated flight tests shall be in a dynamic mode so that the initiator is activated at a minimum lanyard pull rate of 14 feet per second with a free air stream velocity of  $350 \pm 25$  KCAS (see table I) directed at the air inlet of



the initiator. The initiator electrical output (fuze power) shall exceed 75Vdc minimum when measured at V.OUT in figure 3. The output measured at V.IN of figure 3 (turbine release) shall have a magnitude less than 0.95 volts peak at 90 seconds after activation.

4.2.2.2 Rejection. The preproduction sample shall be rejected if failures in excess of those allowed in table V, and/or figure 4, occur. For simulated flight tests, no critical failures, no more than three major failures, and no more than two failures from identical cause are allowed (as defined in table VII). The Government reserves the right to terminate its inspection should excessive failures, as defined in table V, and/or figure 4, occur. In the event of rejection, the Government reserves the right to require the contractor to take corrective action and submit a new preproduction sample or portion thereof.

4.2.3 Lot acceptance test. Each lot shall be subjected to environmental tests according to the requirements and sample levels of tables VII and VIII. The operability tests following exposure to these environments shall consist of those defined for 4.2.3.1.

4.2.3.1 Lot acceptance and functional test.

4.2.3.1.1 Lanyard pull force. The initiator cover shall activate to the open position when the force described in 4.2.3.1.2 is applied. The activation force shall be in accordance with 3.2.1.1.1.1.

4.2.3.1.2 Lanyard separation. A static pull force shall be applied to the initiator pull ring. The cover shall activate per 4.2.3.1.1 prior to separation of the shearing wire. The lanyard separation force shall be in accordance with 3.2.1.1.1.2.

4.2.3.1.3 Release signal. The initiator release signal shall be monitored after the lanyard separation test, 4.2.3.1.2, and exposure to an air stream, 4.2.1.1.2. The release signal shall be in accordance with 3.2.1.1.2.5.

4.2.3.1.4 Minimum run. After performing the test of 4.2.3.1.3 the free air stream shall be reduced to 140 KCAS maximum. The initiator output shall be in accordance with table III and figure 3.

4.2.3.1.5 Functional operation. With the cover up, a free air stream of 350 +/-25 KCAS shall be applied to the initiator for 60 seconds, minimum. The initiator output shall be in accordance with table III and figure 3.

4.2.3.2 Environmental. Any initiator subjected to the following environmental tests shall be considered destroyed and shall not be returned to the lot nor forwarded for service use, but shall be labeled appropriately and held for disposal as specified in the contract or purchase order. After exposure to the following environments, the initiator shall be subjected to operability tests in the sequence shown in 4.2.3.1.1 through 4.2.3.1.5.

4.2.3.2.1 Thermal shock. To determine conformance to 3.2.1.1.3.1, test the initiator as follows:

a. Preproduction sample. Test the initiator in accordance with MIL-STD-331, test 113.1.

b. Inspection lot. Test the initiator in accordance with MIL-STD-331, test 113.1 and -35 degrees F to +140 degrees F.

4.2.3.2.2 Waterproofness. To determine conformance to 3.2.1.1.3.2, test the initiator as follows:

a. Preproduction sample. Test the initiator in accordance with MIL-STD-331, Test 108.

b. Inspection lot. Test the initiator in accordance with MIL-STD-331, Test 108, except at one-half the specified pressure.

4.2.3.2.3 High temperature. To determine conformance to 3.2.1.1.3.3 test the initiator as follows:

a. Preproduction sample. Test the initiator in accordance with MIL-STD-810, method 501.1, procedure I, except as follows: In step 3, the internal chamber temperature shall be maintained for 2 hours (instead of 48 hours) and shall be raised from 160 degrees F to 220 degrees F for the final 10 +/-1 minutes of exposure. Steps 5 and 6 shall not be performed. The initiator shall be tested in accordance with 4.2.3.1 within 5 minutes of removal from the temperature chamber.

b. Inspection lot. Test the initiator in accordance with MIL-STD-810, method 501.1, procedure I, except as follows: In step 3, the internal chamber temperature shall be maintained for 2 hours (instead of 48 hours) and shall be raised from 145 degrees F to 200 degrees F for the final 10 +/-1 minutes of exposure. Steps 5 and 6 shall not be performed. The initiator shall be tested in accordance with 4.2.3.1 within 5 minutes of removal from the temperature chamber.

c. Simulated flight test. Test as in b., but for 1 hour only.

4.2.3.2.4 Low temperature. To determine conformance to 3.2.1.1.3.4, test the initiator as follows:

a. Preproduction sample. Test the initiator in accordance with MIL-STD-810, method 502.1, procedure I, except as follows: Omit steps 2, 3, and 4, hold the temperature at -65 degrees F for 2 hours, and omit steps 6, 7, and 8. The initiator shall then be tested in accordance with 4.2.3.1 within 5 minutes of removal from the temperature chamber.

b. Inspection lot. Test the initiator in accordance with MIL-STD-810, method 502.1, procedure I, except as follows: Omit steps 2, 3, and 4, hold the temperature at -35 degrees F for 2 hours, and omit steps 5, 7, and 8. The initiator shall then be tested in accordance with 4.2.3.1 within 5 minutes of removal from the temperature chamber.

c. Simulated flight test. Test as in b., but for 1 hour only.

4.2.3.2.5 Random vibration. To determine conformance to 3.2.1.1.3.5, test the initiator as follows:

a. Preproduction sample. Test the initiator in accordance with MIL-STD-810, method 514.2, equipment category d.1, procedure IIA, table 514.2-IV, figure 514.2-4, except the initiator shall not be operated during the test.

b. Inspection lot. Test the initiator in accordance with MIL-STD-810, method 514.2, equipment category d.1, procedure IIA, table 514.2-IV, figure 514.2-4, except the vibration level of  $W_2$  (table 514.2-IV, note 4) shall be 0.13 gravity unit squared per Hertz ( $g^2/Hz$ ) (instead of 0.15  $g^2/Hz$ ), and the initiator shall not be operated during the test.

c. Simulated flight test. Test as in b., but with  $W_2 = .04 g^2/Hz$  for 15 min., 1 axis per initiator, 2 initiators in each axis.

4.2.3.2.6 Temperature-humidity.

a. Preproduction sample. Test the initiator in accordance with MIL-STD-331, test 105.1, except the low temperature extreme shall be -65 degrees F (instead of -80 degrees F).

4.2.3.2.7 Extreme temperature storage.

a. Preproduction sample. Test the initiator in accordance with MIL-STD-331, test 112.1, procedure I.

4.2.3.2.8 Transportation vibration-temperature.

a. Preproduction sample. Test the initiator in accordance with MIL-STD-331, test 119, procedure 1.

b. Simulated flight test. Test as in a. but only 1 axis per initiator, with test quantity distributed evenly among the three axes.

4.2.3.2.9 1.5 meter drop.

a. Preproduction sample. Test the initiator in accordance with MIL-STD-331, test 111.1, procedure 2, criterion B.

4.2.3.2.10 Salt fog.

a. Preproduction sample. Test the initiator in accordance with MIL-STD-331, test 107.1, 48-hour test.

4.2.3.3 Visual. Visually inspect the initiator for evidence of external damage.

4.2.4 Special tests and examinations: Characteristics are classified in accordance with DOD-STD-2101(OS). The examinations listed in the following paragraphs shall be performed on inspection lots of the components or assemblies designated. Sampling plans shall be in accordance with MIL-STD-105.

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Critical characteristics shall be 100 percent inspected. Other listed characteristics shall be sampled (as a minimum) to special inspection level S-4, except for material and finish which may be certified by the supplier. Characteristics listed and classified herein as Major shall be inspected using an AQL of 0.4 percent, and characteristics listed and classified as Minor shall be inspected using an AQL of 4.0 percent. Continuous sampling plans in accordance with MIL-STD-1235 and production tool control plans (for inspection of specified characteristics) may be used in lieu of/addition to MIL-STD-105 sampling plans when approved by the Government. Any defective part or assembly found during examination shall be removed from the lot, counted as a defect, and properly dispositioned.

4.2.4.1 Packing, preformed, drawing 8385219.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Material as Specified	Certification
M102	Cross-Section Dia	Std Insp Eqpt

4.2.4.2 Initiator, bomb fuze, drawing 8385220.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Critical		
C1	Lanyard Pull Force	Gauge
C2	Leak Test	Gauge
Major		
M101	Static Pull Force	Gauge
M102	Static Pull Force	Gauge
M103	Material Retention	Visual
Minor		
201	Attach Pull Ring	Visual
202	360 degree Wrap of Shear Wire	Visual
203	Wire Rope Dimension	Gauge
204	Wire Rope Dimension	Gauge

4.2.4.3 Initiator housing assembly, drawing 8385230.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Lock must be loose	Visual

4.2.4.4 Housing, initiator, drawing 8385231.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Housing Length	Gauge
M102	Housing Diameter	Gauge
M103	Pressure Test	Gauge

4.2.4.5 Initiator subassembly, drawing 8385235.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Critical		
C1	Release Signal	Test Fixture
C2	Output Voltage	Test Fixture

4.2.4.6 Cover, initiator, drawing 8385251.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Pressure Leak Test	Gauge

4.2.4.7 Inlet, air, drawing 8385252.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Inlet Diameter	Gauge
M102	Exhaust Port Height	Gauge
M103	Exhaust Port Width	Gauge

4.2.4.8 Latch, breaking, drawing 8385254.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Shear Width	Gauge
M102	Shear Thickness	Gauge

4.2.4.9 Transducer assembly, drawing 8385280.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Overall Height	Gauge
M102	Coil Resistance	Test Equipment
M103	Output Voltage	Test Equipment

4.2.4.10 Coil assembly, drawing 8385281.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Direction of Winding	Visual
M102	Coil Dimension	Gauge

4.2.4.11 End cap assembly, drawing 8385290.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Air Pressure Test	Gauge
M102	Pin Location	Gauge

4.2.4.12 Terminal, lanyard, drawing 8385298.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Material as specified	Certificate
Minor		
201	Hole Diameter	Gauge
202	Max Break	Gauge
203	Hole Diameter	Gauge
204	Position of Hole	Gauge
205	Outer Diameter	Gauge
206	Groove Diameter	Gauge

4.2.4.13 Body, lanyard, drawing 8385299.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Material as specified	Certificate
Minor		
201	Hole Diameter	Gauge
202	Hole Diameter	Gauge
203	Position of Hole	Gauge
204	Hole Diameter	Gauge

4.2.4.14 Cable, power, drawing 9042203.

<u>CATEGORIES</u>	<u>CHARACTERISTICS</u>	<u>INSPECTION</u>
Major		
M101	Power Connector (P2) Dimension	Gauge
M102	Connector Flange (P2) Alignment Marks	Gauge

4.3 Test conditions and provisions. Unless otherwise specified herein, the following test conditions and provisions shall apply for performance of the inspection methods of 4.2:

a. Test environment. Unless otherwise specified herein, the inspection methods of 4.2 shall be performed under the conditions specified in 4.1.

b. Test fixtures. Unless otherwise specified in the contract or

purchase order, all test fixtures required for performance of the inspection of 4.2 shall be configured by the contractor and shall be verified by the contracting activity prior to use.

c. Test sample initiators. The contractor shall prepare test sample initiators in the quantity specified herein for inspection lot acceptance inspections. Test sample initiators shall be in accordance with Drawing 8385220.

d. Lot inspection report. When specified in the contract or purchase order, the contractor shall prepare a lot inspection report for each lot produced under a specified contract, including first article, inspection, and rejected lots. The report shall, as a minimum, include the following:

- (1) A summary listing, by initiator lot number, of all deviations, waivers, and drawing or specification changes applicable to the lot
- (2) A summary of acceptance test results on the lot sample initiators as follows:

(a) A listing of defects which occurred, in lot acceptance test by initiator lot number, defect classification, and drawing number or specification paragraph

(b) A complete description of each defect identified in (a) above. The description shall list, by lot number, the part or process involved, and shall include the details of failure cause and analysis, rework or corrective action performed, and resubmission acceptance testing performed to validate the corrective action

e. Inspection sequence. The inspections of 4.2 shall be performed in the sequences shown on table VI as applicable. When feasible, sequential inspections may be combined, provided it can be demonstrated by the contractor that the applicable requirements of sections 3 and 5 have been individually met. The contractor shall not deviate from the inspection methods of 4.2.

## 5. PREPARATION FOR DELIVERY

5.1 Preservation-packaging. Preservation and packaging shall be in accordance with FED-STD-102, level A, and as specified on drawing 9042212.

5.2 Packing. Packing shall be in accordance with FED-STD-102, level A, and as specified on drawing 9042212. Initiators, along with other components, shall be packed in M548 shipping containers in accordance with drawing 9042212

5.3 Marking. In addition to any special marking required by the contract or purchase order, all interior and exterior marking shall be in accordance with MIL-STD-129 and drawing 9042212.

## 6. NOTES

6.1 Intended use. The initiator is intended for use in the MK80 series and the M117 general purpose bombs (see 3.1).



6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Preproduction sample quantity. (Note: The quantities listed in 4.2.2 should be increased by approximately 10 percent to allow for no-test conditions and non-fuze system failures such as loss of data.)
- c. Time required for Air Force testing.
- d. Packing level.
- e. Rework.
- f. Date and issue of DODISS that applies (see 2.1).

6.3 Identification of changes. The margins of this specification are marked with a vertical line to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notation and relationship to the last previous issue.

TABLE I  
TEST AIRSPEEDS AND EQUIVALENT PRESSURES

FREE AIR STREAM (KCAS)	TEST AIRSPEED (KCAS)	SETTLING TANK (TOTAL) PRESSURE <sup>1</sup> (PSIG)
100	85 <sup>2</sup>	0.171
140	128 <sup>2</sup>	0.390
250	228 <sup>2</sup>	1.262
325	325 <sup>3</sup>	2.644
350	350 <sup>3</sup>	3.095
375	375 <sup>3</sup>	3.590
700	700 <sup>3</sup>	15.163

1. A schematic for the functional test is shown in figure 1. Unless otherwise specified in the contract or purchase order, the contractor shall demonstrate the functional test set-up calibration (paragraph 4.3b).

2. Test airspeed is below the free air stream speed because of the initiator position behind the bomb suspension lug.

3. Test airspeeds of 325 KCAS and above have not been adjusted because insufficient wind tunnel test data is available.

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TABLE II  
CROSS REFERENCE REQUIREMENTS LISTING

Requirement Paragraph	Section 3 Paragraph	Section 4 Paragraph
Functional	3.2.1.1	4.2.1
Electrical Output	3.2.1.1.2	4.2.1.1
Lanyard Pull	3.2.1.1.1.1	4.2.3.1.1
Lanyard Separation	3.2.1.1.1.2	4.2.3.1.2
No Start	3.2.1.1.2.1	4.2.1.1.1
Start	3.2.1.1.2.2	4.2.1.1.2
Minimum Run	3.2.1.1.2.3	4.2.1.1.3
Environmental	3.2.1.1.3	4.2.3.2
Thermal Shock	3.2.1.1.3.1	4.2.3.2.1
Waterproofness	3.2.1.1.3.2	4.2.3.2.2
High Temperature	3.2.1.1.3.3	4.2.3.2.3
Low Temperature	3.2.1.1.3.4	4.2.3.2.4
Random Vibration	3.2.1.1.3.5	4.2.3.2.5
Temp. - Humidity	3.2.1.1.3.6	4.2.3.2.6
Extreme Temp. Stor.	3.2.1.1.3.7	4.2.3.2.7
Transportation	3.2.1.1.3.8	4.2.3.2.8
Vibration - Temp.	3.2.1.1.3.9	4.2.3.2.9
1.5 Meter Drop	3.2.1.1.3.9	4.2.3.2.9
Salt Fog	3.2.1.1.3.10	4.2.3.2.10
Preproduction Sample	3.4	4.2.2
Reliability	3.2.1.1.4	4.2.2.1

TABLE III  
FZU-48/B ELECTRICAL INTERFACE  
CONNECTOR PIN REQUIREMENTS DEFINITION  
(AIR FORCE DRAWING 8385211, TABLE I)

Pin No.	Name	Input/Output Requirement	Functional Requirement
1	Fuze Power	<p>0 Vdc at free air stream velocities of 100 KCAS or less. See table I.</p> <p>75 Vdc min at free air stream velocities of 250 KCAS for D-Lug, 350 KCAS for T-Lug. Measured at V.OUT in figure 3.</p> <p>32 Vdc min at free air stream velocity of 140 KCAS. Measured at V.OUT in figure 3.</p>	The load on the output shall consist of two simulated fuze loads (figure 2), each of which conforms to the schematic of figure 3.
2	Common Ground	Ground return for Pins 1 and 4.	Common ground connected to power supply and metal case parts.
3	Sensor Fire	A through connector connecting front to rear conduit. High potential up to 500 Vac.	An isolated through wire to interface a proximity sensor output fire pulse to a fuze sensor fire input.
4	Release Signal	The output measured at V.IN of figure 3 shall be a negative signal whose magnitude is 2.1 volts peak minimum for 7 seconds after activation at a free air stream velocity of 250 KCAS and which decays to 0.5 volts peak maximum at 90 seconds after activation.	A negative halfwave rectified signal to apply a series of voltage pulses for at least 7 and not more than 90 seconds after lanyard pull. The safety circuit, figure 2 Q1, shall shunt Pin 4 to Pin 2 between 7 and 90 seconds after lanyard pull for temperatures from -65 degrees F to +160 degrees F.
ALL PIN NUMBERS COMMON ON BOTH RECEPTACLES			

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TABLE IV  
CONTINUITY TEST REQUIREMENTS

PIN	to	PIN
J1-1		J2-1
J1-2		J2-2
J1-3		J2-3
J1-4		J2-4

NOTE: Continuity resistance shall  
not exceed 1 Ohm

TABLE V  
PREPRODUCTION SAMPLE ALLOCATION

Test	Sample Size	Passing Criteria	Allowable Failure
<u>MIL-STD-331 Tests</u>			
105.1 Temp. Humidity	6	Operable*	1. Three operability failures allowable, with no more than two failures of identical cause.
107.1 Salt Fog	5	Operable*	
108 Waterproofness**	6	Operable*	2. Maximum of two failures per environment is allowable. The failures occurring for each environment shall not be of identical cause.
111.1 1.5 Meter Drop, Criterion B. Criterion A applied if interface connectors are damaged.	5	Operable*	
112.1 Extreme Temp. storage	6	Operable*	3. No critical failures allowed as defined in table VII.
113.1 Thermal	6	Operable*	
119 Transportation Vibration-Temperature	6	Operable*	
<u>MIL-STD-810 Tests</u>			
Method 514.2, Procedure IIA, Part 1, Figure 514.2-4, and Table 514.2-IV of Notice 1, Vibration	6	Operable*	
Method 501, High Temp.	6	Operable*	
Method 502, Low Temp.	6	Operable*	
*Operability tests consist of those in 4.2.3.1.			
**No evidence of water in initiator.			

TABLE VI  
SIMULATED FLIGHT TESTS

QTY	ENVIRONMENT 1	ENVIRONMENT 2	ENVIRONMENT 3	ALLOWABLE FAILURES
15	Ambient Operability 4.2.3.1	--	--	1. Three operability failures allowable, with no more than two failures of identical cause.
6	Transportation Vibr.-Ambient 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	Ambient Operability* 4.2.3.1	2. Maximum of two failures per environment is allowable. The failure occurring for each environment shall not be of identical cause.
6	Transportation Vibr.-Ambient 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	High Temp. Operability* 4.2.3.2.3(c)	
6	Transportation Vibr.-Ambient 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	Low Temp. Operability* 4.2.3.2.4(c)	3. No critical failures allowed as defined in table VII.
6	Transportation Vibr.-High Temp. 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	Ambient Operability* 4.2.3.1	
3	Transportation Vibr.-High Temp. 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	High Temp. Operability* 4.2.3.2.3(c)	
3	Transportation Vibr.-High Temp. 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	Low Temp. Operability* 4.2.3.2.4(c)	
6	Transportation Vibr.-Low Temp. 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	Ambient Operability* 4.2.3.1	
3	Transportation Vibr.-Low Temp. 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	High Temp. Operability* 4.2.3.2.3(c)	
3	Transportation Vibr.-Low Temp. 4.2.3.2.8(b)	Random Vibration 4.2.3.2.5(c)	Low Temp. Operability* 4.2.3.2.4(c)	

\*Operability tests consist of those in 4.2.2.1.1.

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TABLE VII  
LOT ACCEPTANCE CLASSIFICATION OF CHARACTERISTICS

Function	Paragraph	Characteristic	Classification
Lanyard Pull Force	3.2.1.1.1.1	Low Activation High Activation	Critical Major
Lanyard Separation Force	3.2.1.1.1.2	Low Separation High Separation	Critical Major
Release Signal	3.2.1.1.2.5	Low TR Time High TR Time	Major Critical
"All Start" Output	3.2.1.1.2.2	High Start Speed	Major
Minimum Run Output	3.2.1.1.2.3	High Minimum Run Speed	Major



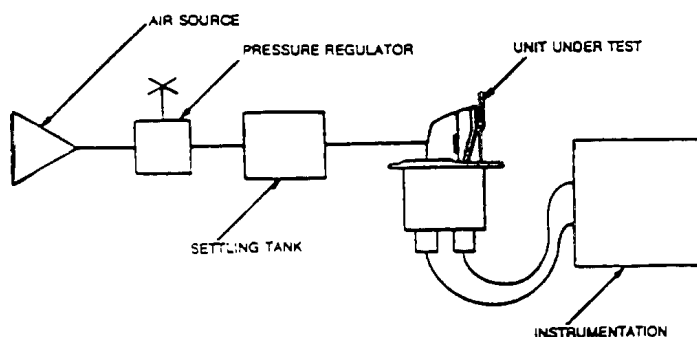
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TABLE VIII  
LOT ACCEPTANCE SAMPLE ALLOCATION

SAMPLING PLAN: MIL-STD-105D, GENERAL INSPECTION  
LEVEL I, AQL=1.5

Test	Paragraph	Test Sample	Requirement
Thermal Shock	4.2.3.2.1	3	Operable*
Waterproofness	4.2.3.2.2	3	Operable* and no evidence of water in the initiator
High Temperature	4.2.3.2.3	3	Operable*
Low Temperature	4.2.3.2.4	3	Operable*
Random Vibration	4.2.3.2.5	3	Operable*
Ambient Functional	4.2.3.1	Balance	Operable*
		Total per sampling plan.	Accept/Reject criteria based upon total sample required by sampling plan. Failures are cumulative.

\*Operability tests consist of those in 4.2.3.1.



#### SYSTEM REQUIREMENTS

1. SYSTEM SHALL INPUT TO THE INITIATOR AN AIR PRESSURE EQUIVALENT UP TO 375 KCAS AT SEA LEVEL TO MEET THE REQUIREMENTS OF 4.2.1.2 AND 4.2.3.
2. SYSTEM SHALL ELECTRICALLY LOAD THE INITIATOR IN ACCORDANCE WITH FIGURE 2 AND FIGURE 3.
3. SYSTEM SHALL MEASURE INITIATOR ELECTRICAL OUTPUT AND TURBINE RELEASE SIGNAL IN ACCORDANCE WITH TABLE VII AND FIGURE 3.

FIGURE 1. BLOCK DIAGRAM FOR FZU-48/B FUNCTIONAL TEST

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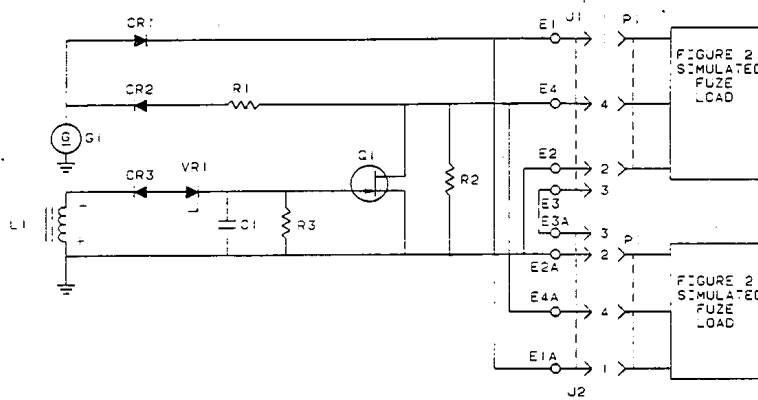


FIGURE 2. BOMB FUZE INITIATOR SCHEMATIC  
(AIR FORCE DRAWING 8385211, FIGURE 1)

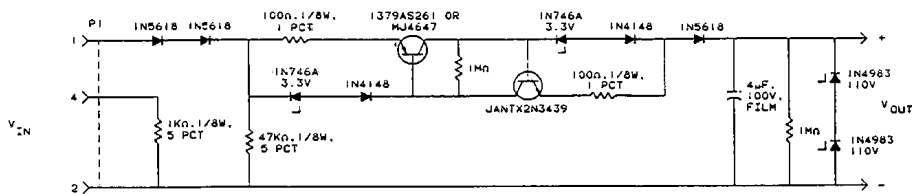
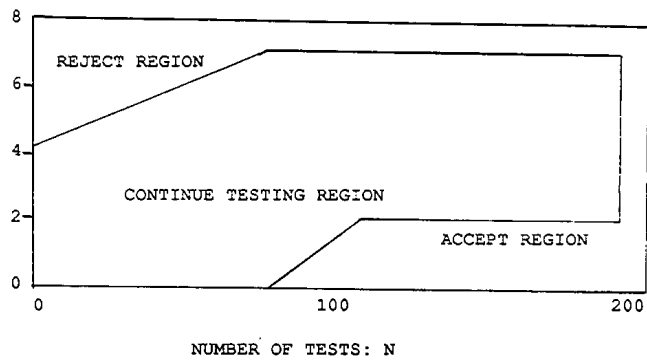


FIGURE 3. SIMULATED FMU-139 LOAD SCHEMATIC  
(AIR FORCE DRAWING 8385211, FIGURE 2)



NUMBER OF FAILURES	ACCEPT IF N >	REJECT IF N <
0	97	0
1	121	0
2	204	0
3	204	0
4	204	0
5	204	25
6	204	51
7	204	76

NOTE. REJECT ON 8 FAILURES REGARDLESS OF VALUE N

FIGURE 4. FLIGHT TEST ACCEPTANCE AND REJECTION CRITERIA

Appendix I

10. FZU-48(D-2)/B, DUMMY INITIATOR SPECIAL REQUIREMENTS

10.1 SCOPE.

10.1.1 Scope. This appendix establishes the requirements for manufacture and acceptance of the FZU-48(D-2)/B, Dummy Initiator.

10.1.2 Cross referencing to body of specification. Applicable sections of the body of SP8385220 are cited in this appendix. Sections not referenced do not apply to the dummy initiator.

10.2 APPLICABLE DOCUMENTS

Paragraph 2.1 applies. Additional documents are listed below.

DRAWINGS

98747-IL9156952	FMU-139(D-2)A/B Dummy Fuze and Accessories (USAF), Index List
18894-8385266	Initiator, Dummy, FZU-48(D-2)/B
18894-8644061	Training Pack, FMU-139(D-2)A/B

10.3 REQUIREMENTS

10.3.1 Item definition. The FZU-48(D-2)/B is a non-functional inert training item which conforms dimensionally and visually to the FZU-48/B.

10.3.1.1 Government furnished property list. When specified by the contracting officer, expended FZU-48/B lot acceptance units will be furnished for rework in accordance with drawing 8385266.

10.3.2 Design and construction. The requirements of 3.3 apply except for 3.3.1, which is replaced by 10.3.2.1.

10.3.2.1 Production drawings. The dummy initiator shall be assembled with the drawings, data lists, and other documents listed on index list (IL) 9156952.

10.4 QUALITY ASSURANCE PROVISIONS

10.4.1 General. Qualification of the dummy initiator shall be performed through quality conformance inspection. There are no functional or flight test requirements.

10.4.1.1 Responsibility for inspection. The requirements of 4.1.1 apply.

10.4.1.2 Lot formation. Lot formation is required only to the extent that changes to any process, specification, drawing, or drawing revision affect the homogeneity of the submitted product as defined in 4.1.2. Lots can be any convenient size. Lot numbering, as required, shall be in accordance with MIL-STD-1168.

10.4.1.3 Submission of product. The provisions of 4.1.3 apply.

10.4.2 Quality conformance inspection. Verification of the characteristics below is required on 100 percent of the dummy initiators. Any defective initiator shall be rejected and properly dispositioned on an individual item basis.

10.4.2.1 Initiator, Dummy, FZU-48 (D-2) /B, drawing 8385266.

<u>CHARACTERISTIC</u>	<u>INSPECTION</u>
Note 15 - presence and legibility of markings	Visual
Note 14 - installation of spring pin	Visual
Housing diameter - 1.900 in. max	Gauge or Std Insp Eqpt
Retention of Power Cable (9042203) by End Cap (find no. 11) and Spring Clips (find no. 14)	Test Fixture

10.4.3 Test fixtures. Unless otherwise specified in the contract or purchase order, all gauges and test fixtures required for performance of the inspection of 10.4.2 shall be configured by the contractor and shall be verified by the contracting activity prior to use.

#### 10.5 PREPARATION FOR DELIVERY

10.5.1 Preservation/packaging. Preservation and packaging shall be in accordance with FED-STD-102, level A, and as specified in drawing 8644061.

10.5.2 Packing. Packing shall be in accordance with FED-STD-102, level A, and as specified on drawing 8644061. Dummy initiators, along with other inert components, shall be packed in PA-19 shipping containers in accordance with drawing 8644061.

10.5.3 Marking. In addition to any special markings required by the contract or purchase order, all interior and exterior markings shall be in accordance with MIL-STD-129 and drawing 8644061.

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10.6 NOTES

10.6.1 Intended use. The dummy initiator is intended for use in training environments only.

10.6.2 Ordering data.

10.6.2.1 Acquisition requirements. The provisions of 6.2.1 a., d., e., and f. apply.

10.6.2.2 Government-furnished material. FZU-48/B Bomb Fuze Initiators expended during the tests of 4.2.2 and 4.2.3 should be provided as Government-furnished material, to be reworked in accordance with drawing 8385266, to the extent that such use is more cost effective to the Government.